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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/620,782

07/15/2003

Dirk J. Sundt

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07/14/2005

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EXAMINER

MAGEE, THOMAS J

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/620,782

Applicant(s)

SUNDT ET AL.

Examiner

Thomas J. Magee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25 - 41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 33 - 41 is/are allowed.
- 6) ☒ Claim(s) 25-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 07152003:09152003.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections – 35 U.S.C. 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 29 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Dependent Claim 29 recites "a layer of insulating material filling the trench," whereas the process requires the presence of a mask layer formed over the first layer. However, in Figure 3G there is no mask layer shown after deposition of an insulating material in the trench. In like fashion, the Specification recites that the mask layer has been removed (p.5, lines 18 – 20). It is then unclear as to whether or not the mask layer is present or absent in Claim 29. Correction and/or clarification is required.

Claim Rejections – 35 U.S.C. 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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4. Claims 25 – 32 and 37 - 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Peidous et al. (US 6,027,982).

5. Regarding Claim 25, Peidous et al. disclose a semiconductor structure (Figure 5) comprising:

a trench (35) formed in a substrate (31)(Figure 5)

a first layer (comprising a composite layer of 32 and 33) of first material formed over the substrate and having a faceted ("having planes") therethrough over the trench, the faceted opening having an opening over the trench approximately equal in dimensions to an opening of the trench (Figure 5), and

a mask layer (34) formed over the first layer and having an opening therethrough over the opening of the first layer.

6. Regarding Claim 26, Peidous et al. disclose that the faceted opening of the first layer undercuts (Figure 5) the opening of the mask layer (34).

7. Regarding Claim 27 Peidous et al. disclose that the first material comprises a silicon nitride layer (33) (Col. 3, line 31).

8. Regarding Claim 28, Peidous et al. disclose that the mask layer comprises a layer of silicon oxide material (Col. 3, lines 32 – 35).

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9. Regarding Claims 29 and 31, Peidous et al. disclose that a layer of insulating material (40) (Figure 8) fills the trench.

8. Regarding Claim 30, Peidous et al. disclose a semiconductor structure comprising:

a trench (35) formed in a substrate (31) (Figure 4), the trench having a trench opening dimension and

a first layer of silicon nitride material (33) (Col. 3, line 31) formed over the substrate and having a faceted opening therethrough over the trench, the faceted opening having a first opening adjacent the trench having a first opening dimension and further having a second opening dimension greater than the first opening dimension, the first opening dimension of the faceted opening approximately equal to the trench opening dimension. (See Figure 4).

10.. Regarding Claim 32, Peidous et al. disclose the presence of a pad oxide layer (32) (Col. 3, lines 28 – 29) interposed between the first layer (33) and the substrate (31), the pad oxide layer having an opening therethrough over the trench.

11. Regarding Claim 37, Peidous et al. disclose a semiconductor structure comprising:

a trench formed in a substrate (Figure 5), the trench having an opening with a trench opening dimension,

a mask layer (34) having an opening therethrough and located over the trench, the opening in the mask layer having a mask layer opening dimension, and

a first layer (composite 32 and 33) interposed between the substrate and the mask layer, the first layer having an opening undercutting the opening of the mask layer, the opening in the first layer having a dimension adjacent the substrate approximately equal to the trench opening dimension (See Figure 5).

12. Regarding Claim 38, Peidous et al. disclose the semiconductor structure wherein:

the first layer having a first side proximate to the substrate and a second side opposite the first side (Figure 5).

13. Regarding Claim 39, Peidous et al. disclose (Col. 3, lines 43 – 56) that the materials from which the first layer and mask layer are formed can be selectively etched with respect to one another.

14. Regarding Claim 40, Peidous et al. disclose that the mask layer (34) comprises a layer formed from a silicon oxide material (Col. 3, line 33).

15. Regarding Claim 41, Peidous et al. disclose that the first layer comprises a layer formed from a silicon nitride layer (Col. 3, line 31).

Allowable Subject Material

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16. Claims 33 – 36 are allowed. The prior art of record do not reasonably teach or suggest, either singularly or in combination, the limitation(s) in Claim 33 of a semiconductor structure comprising, *"a trench formed in a substrate, the trench having an opening with a trench opening dimension, a first layer of silicon nitride material formed over the substrate and having a first side proximate to the substrate and a second side opposite of the first side and further having an opening therethrough over the trench, the opening having a first dimension along the first side approximately equal to the trench opening dimension and a second dimension along the second side greater than the first dimension and a mask layer formed adjacent the second side of the first layer of silicon nitride, the mask layer having an opening over the opening through the first layer of silicon nitride with a dimension that is less than the second dimension."*

Response to Arguments

17. Commentary by Applicant (pp. 8 – 11, Response) is based on the limitations recited in the amended claims and not on those contained in the previous Office Action. Therefore, additional elaboration here is not germane since discussion is within body of the current Office Action.

Conclusions

18. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to **Thomas Magee**, whose telephone number is **(571) 272 1658**. The Examiner can normally be reached on Monday through Friday from 8:30AM

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to 5:00PM (EST). If attempts to reach the Examiner by telephone are unsuccessful, the examiner's acting supervisor, **Stephen Loke**, can be reached on **(571) 272-1657**. The fax number for the organization where this application or proceeding is assigned is **(703) 872-9306**.

Thomas Magee
June 15, 2005

Steven Loke
Primary Examiner
